CLAIMS

1. An image analysis method comprising the steps of:

i) capturing at least two primary images of at least one part of a sample (122) in a first state using imaging means (102), the at least two primary images being captured at different focal planes;

ii) capturing at least two secondary images of said at least one part of said sample (122) in a second state using imaging means (102), the at least two secondary images being captured at differing focal planes;

iii) selecting one of said primary images that has the best definition of at least one feature therein using processing means (114);

iv) selecting one of said secondary images which has the best definition of said at least one feature therein using processing means (114); and

v) comparing the primary and secondary images selected in steps (iii); and (iv) in order to determine the displacement, if any, of a feature within said part of said sample (122).

2. The method of claim 1 including providing the imaging means (102) in a form including a microscope (102) or in a form including an ultrasound transducer (702).

3. The method of either of claims 1 or 2 including determining a best focus sub-image from the plurality of second plurality of images in step (iv).

4. The method of any preceding claim including measuring an out-of-plane displacement of at least one feature by multiplying a number of

steps moved by the imaging means in achieving a desired secondary image quality by the step size.

5. The method of any preceding claim including providing primary image in the form of an initial image captured by the imaging means (102) having a single nominal focal plane depth or in the form of a composite image (410) composed of sub-images (412a-412e) each defining a focal plane depth.

6. The method of any preceding claim including outputting at least one of the following to an output device: a strain map (600), a deformation map, a numerical measure of deformation.

7. The method of any preceding claim including measuring a deformation of the sample (122) in the (xy) plane to a sub-pixel resolution of at least 0.1 pixels.

8. An image analysis apparatus (100) comprising imaging means (102) arranged to capture an image of at least part of a sample (122), processing means (114) arranged to process the image and drive means (108) arranged to effect relative motion between the sample (122) and the imaging means (102) characterised in that the imaging means (102) is arranged to capture at least two images (404a-c) of a part of the sample (122) at at least two focal planes, relative movement between the sample (122) and the imaging means (102) being effected by the drive means (108) the processing means (114) being arranged to determine a correlation of each of said images (404a-c) with a reference and to select one of the at least two images (404a-c) upon the basis of said correlation, and the processing means (114) being further arranged to determine a displacement, if any, of at least one feature within said part of the sample (122).

9. Apparatus according to claim 8 further characterised by the imaging means including a microscope (102) or an ultrasound transducer (702).

10. Apparatus according to either of claims 8 or 9 further characterised by the processing means (114) being arranged to select a best focus sub-image from the at least two images.

11. Apparatus according to any one of claims 8 to 10 further characterised by the reference being a primary image either from an image having a nominal single focal plane or a sub-image (412a-412e) from a composite primary image (410) where each sub-image (412a-412e) defines a localised focal plane.

12. A data structure encoded upon a computer readable medium (900) the data structure including:

a first entry corresponding to a data set indicative of part of a sample (122) in a first state; characterised in that:

a plurality of secondary entries corresponding to at least two inputs received from an imaging means (102), of said part of the sample (122) in a second state;

the first entry and the at least two second entries are arranged to be operated upon by processing means (114) to derive respective subsets of data; and

corresponding subsets of data derived from the first entry and the at least two second entries are arranged to be operated upon by the processing means (114) to determine a match therebetween.

13. A data structure according to claim 12 further characterised by the first entry and the plurality of secondary entries being image data files.

14. A data structure according to claim 13 further characterised by the subsets of data being sub-image data files, which are portions of an area imaged by the imaging means (102).

15. A data structure according to any one of claims 12 to 14 further characterised by the subsets of data files being arranged to be operated upon by the processing means by the execution of a correlation technique, a fringe projection technique or a spectrum suppression technique thereupon.

16. A data structure according to any one of claims 12 to 15 further characterised by the second entries corresponding to at least two image data sets obtained at differing focal planes.

17. Computer software which run on an apparatus causes a processing means of the apparatus to generate a data set indicative of an initial image of a sample in said first state and further causes the processing means to produce a plurality of data sub-sets indicative of regions of the sample from said data set, the software being characterised by:
causing imaging means to capture a plurality of secondary images of the sample in said second state at at least two of focal planes and causing the processing means to produce a plurality of sub-images corresponding substantially in location to the regions of the sample defined by the data sub-sets from each of the plurality of secondary images and subsequently causing the processing means to correlate at least one of the data sub-sets with each corresponding one of the plurality of secondary sub-images using processing means selecting one of the secondary sub-images for each data sub-set based upon said correlation and determining a displacement, if any, of least one feature within the sub-image.